# CALMIM Report Daily and Intermediate Cover (Based on Fink Road Landfill Site Location) CalRecycle May 30, 2012

Daily cover (15% of 90 acres)- no vegetation or gas recovery; 9 inches silty clay loam; low organic content; default saturated bottom. Intermediate Cover (85% of 90 acres)- 75% gas recovery; 15 inches silty clay loam; low organic content; default saturated bottom.

		CALM	IM Version:	5.0C	
		Fink	Road Land	mer	
			04/14/2012		
		Daily 1	5% 90 acre	Interm. 85% 90	acre
	Gas Recov		0%	75%	
	Cover Typ		Daily	Intermediate	
	Cover area	96	15%	85%	
		Daily 15%	90 acre	Interm. 85% 90 a	re
	Layer 1	SILTY CLAY	LOAM 9	SILTY CLAY LOAM	15
	Layer 2	-			COLUMN TO THE PARTY OF THE PART
	Layer 3				
	Layer 4				
	Layer 5				
	Layer 6		_		
	Layer 7				
	Layer 8				
	Layer 9		_	-	
	Layer 10	-			
			- 1	Daily 15% 90 acre	Interm. 85% 90 acre
	Methane Concentration	Base of Cove	90	0.3%	34.88%
	ne Emission without (			2.56	158.55
Meth	ane Emission with Ox		(day)	2.51	25.59
	% Oxidati			1.94	84.07
	Cover Emissions with			50051.42	2891699.76
	over Emissions witho			51070.84	1.791590942E7
Ri	maining Oxidation Ca	pacnytgim~2/d	ay)	0.0	1.39

## **CALMIM Report Final Cover (Based on Fink Road Landfill Site Location)**

Final Cover (Total 584 acres for 25% to equal 146 acres)- water balance 4' silty clay loam; gas recovery 100% and 0% at 5% methane for shutdown; 50% vegetation; low organic content; base CH4 varied from 55% to 5%; unsaturated free drainage bottom.

					CALMIM	/ersion: 5	i.0C				
					Fink Ro	ad Land	fill				
					04/1	4/2012					
			_						_		
					Final 1	Final 2	Final 3	Final 4			
			Gas Rec	overy	100%	100%	100%	100%			
			CoverT	ype	Final	Final	Final	Final			
			Cover an	ea%	25%	25%	25%	25%			
						· ·			7	. 1	
		Fina			Final 2			al 3	Final		
	Layer 1	SILTY CLAY	LOAM 48	SILT	Y CLAY LO	AM 48	SILTY CLA	Y LOAM 4	8 SILTY CLAY	LOAM 48	
	Layer 2					_					
	Layer 3										
	Layer 4					_					
	Layer 5										
	Layer 6					_					
	Layer 7					_				_	
	Layer 8					_					
	Layer 9					_				_	
	Layer 10										
					Final	1	Final	2	Final 3	Final	
	tathana Cana	entration Base	of Count	-	55.0		50.09		45.0%	40.0	
		entration Base without Oxidati		doub.	77.5		70.48		63.42	56.3	
		with Oxidation			3.83		2.82		1.98	1.3	
weth		Oxidation	ii (gerir-2/0a	77	95.2		96.19		97.11	97.9	
Total		ons with Oxida	ation (kaba)	ari	82629		607933		426979.88	28342	
		ns without Oxi			1.671538		1.5195800		1.367621419E7	1.215662	
		ation Capacity			133.2		139.3		145.5	1.215662	
re	maining Code	ation capacity	(griff 2/day)		133.2	.0	139.3	,	143.3	131.	0.9

# **CALMIM Report Final Cover (cont.)**

#### CALMIM Version: 5.0C Fink Road Landfill 04/14/2012

	Final 1	Final 2	Final 3	Final 4
Gas Recovery	100%	100%	100%	100%
Cover Type	Final	Final	Final	Final
Cover area %	25%	25%	25%	25%

•	Final 1	Final 2	Final 3	Final 4
Layer 1	SILTY CLAY LOAM 48			
Layer 2				
Layer 3				
Layer 4				
Layer 5				
Layer 6				
Layer 7				
Layer 8				
Layer 9				
Layer 10				

•	Final 1	Final 2	Final 3	Final 4
Methane Concentration Base of Cover	55.0%	50.0%	45.0%	40.0%
Methane Emission without Oxidation (g/m*2/day)	77.51	70.46	63.42	56.37
Methane Emission with Oxidation (g/m^2/day)	3.83	2.82	1.98	1.31
% Oxidation	95.2	96.19	97.11	97.92
Total Cover Emissions with Oxidation (kg/year)	826292.7	607933.4	426979.88	283423.87
Total Cover Emissions without Oxidation (kg/year)	1.671538758E7	1.519580089E7	1.367621419E7	1.215662749E7
Remaining Oxidation Capacity(g/m*2/day)	133.26	139.3	145.5	151.89

	Final 1	Final 2	Final 3	Final 4
Gas Recovery	100%	100%	100%	100%
Cover Type	Final	Final	Final	Final
Cover area %	25%	25%	25%	25%

-	Final 1	Final 2	Final 3	Final 4
Layer 1	SILTY CLAY LOAM 48			
Layer 2				
Layer 3				
Layer 4				
Layer 5				
Layer 6				
Layer 7				
Layer 8				
Layer 9				
Layer 10				

•	Final 1	Final 2	Final 3	Final 4
Methane Concentration Base of Cover	35.0%	30.0%	25.0%	20.0%
Methane Emission without Oxidation (g/m^2/day)	49.32	42.28	35.23	28.18
Methane Emission with Oxidation (g/m^2/day)	0.8	0.43	0.17	0.04
% Oxidation	98.59	99.13	99.59	99.88
Total Cover Emissions with Oxidation (kg/year)	173400.76	92718.22	36910.47	9077.75
Total Cover Emissions without Oxidation (kg/year)	1.06370408E7	9117454.1	7597867.4	6078280.7
Remaining Oxidation Capacity(g/m^2/day)	158.31	164.79	170.83	175.9

	Final 1	Final 2	Final 3	Final 4
Gas Recovery	100%	100%	100%	0%
Cover Type	Final	Final	Final	Final
Cover area %	25%	25%	25%	25%

	Final 1	Final 2	Final 3	Final 4
Layer 1	SILTY CLAY LOAM 48			
Layer 2				
Layer 3				
Layer 4				
Layer 5				
Layer 6				
Layer 7				
Layer 8				
Layer 9				
Layer 10				

•	Final 1	Final 2	Final 3	Final 4
Methane Concentration Base of Cover	15.0%	10.0%	5.0%	5.0%
Methane Emission without Oxidation (g/m^2/day)	21.14	14.09	7.05	7.05
Methane Emission with Oxidation (g/m*2/day)	0.0	0.0	0.75	0.75
% Oxidation	99.98	100.0	84.25	84.25
Total Cover Emissions with Oxidation (kg/year)	622.24	18.88	162801.26	162801.26
Total Cover Emissions without Oxidation (kg/year)	4558694.01	3039107.31	1519520.61	1519520.61
Remaining Oxidation Capacity(g/m^2/day)	177.09	151.5	68.16	68.16

# Additional CalRecycle CALMIM Simulations for Sensitivity (Based on Fink Road Landfill Site Location)

Varying daily and alternative daily cover (per acre)- no vegetation or gas recovery; 6-9 inches silty clay loam with low organic content; high organic content for ADC; default saturated base.

			Fink F	Version: 5. oad Landfi					
		04/13/2012							
			Daily 1	Daily 2	Daily 3	Dai	ly 4		
		Gas Recovery	0%	0%	0%	09	%		
		Cover Type	Daily	Daily	Daily	Da	illy		
		Cover area %	25%	25%	25%	25	%		
	Daily 1	Daily 2		Di	illy 3			Daily 4	
Layer 1	SILTY CLAY LOAM 6	SILTY CLAY LO	DAM 9	ADC Wood	Chips (a	10 12	ADC Compo	sted Organic	Materials 12
Layer 2						-			
Layer 3									
Layer 4									
Layer 5									
Layer 6									
Layer 7									
Layer 8									
Layer 9									
Layer 10									
				Da	N1	Daily 2	Daily 3	Daily 4	
	Mothana Con	centration Base o	f Count		3%	0.3%	0.3%	0.3%	
	Methane Emission				.3	2.56	4.12	2.53	
		on with Oxidation (			9	2.53	3.05	2.48	
		% Oxidation	grin-20a		03	1.27	24.64	1.94	
	Total Cover Emis		on (kralvas			3737.9	4510.23	3666.86	
	Total Cover Emissi					3785.95		3734.65	
		dation Capacity(g/			02	0.0	0.32	0.0	

Intermediate cover; 50-90% Gas Recovery; 12-15 inches silty clay loam; low organic content; 25% vegetation; default saturated bottom

				MIM Version k Road Lan					
			FIF						
				04/13/2012					
				Int. 2	-1-	Int. 3		Int. 4	
	Gas Recovery		50%	90%	_	50%		90%	
	Cover Type		mediate	Intermediat	e I	Intermediate	Inte	rmediate	
	Cover area %		25%	25%		25%		25%	
	Y	-							
	Int 1		Int			Int. 3			Int. 4
Layer 1	SILTY CLAY LOAM	112	SILTY CLA	Y LOAM 15	SIL	TY CLAY LOA!	M 15	SILTY	LAY LOAM 15
Layer 2		_			_				
Layer 3		_			_				
Layer 4		_			_				
Layer 5		$\rightarrow$			-			_	
Layer 6		_							
Layer 7		_			_				
Layer 8		_							
Layer 9		_			-				
Layer 10									
				Int	1	Int. 2	-	Int. 3	Int. 4
Me	thane Concentration	Base o	of Cover	38.2	396	32.85%	1 3	38.25%	32.85%
	e Emission without Or					149.88		174.51	149.88
	ne Emission with Oxid			122		18.31		39.05	18.31
meana	% Oxidatio		g 2-ddy/	46.3		87.9		77.79	87.9
Total C	over Emissions with		on (kg/year)			27042.46		7687.69	27042.46
	ver Emissions withou					221383.56		7775.62	221383.56
	aining Oxidation Cap			0.0		3.99	-	0.1	3.99

## Additional CalRecycle CALMIM Simulations for Sensitivity (cont.)

Intermediate cover- 70% Gas Recovery; 12 inches silty clay loam; low organic content; vary vegetation 10-75%; default saturated bottom.

				M Version: 5 Road Land					
				4/13/2012					
		_							
			1	Int. 2	Int. 3		Int. 4		
	Gas Recovery	709		70%		70%		70%	
	Cover Type	Interme		ntermediate	In	ntermediate	Inte	rmediate	
	Cover area %	259	%	25%		25%		25%	
	Int. 1		Int. 2			Int. 3			Int. 4
Layer 1	SILTY CLAY LOAM	112 SI	LTY CLAY	LOAM 12	SILT	TY CLAY LOAM	112	SILTY C	LAY LOAM 12
Layer 2									
Layer 3									
Layer 4									
Layer 5									
Layer 6									
Layer 7									
Layer 8									
Layer 9									
Layer 10									
				Int 1		Int. 2		Int. 3	Int 4
Mi	thane Concentration	Base of C	over	35.559	6	35.55%	1 3	35.55%	35.55%
	Emission without O			210.2		211.1		212.0	212.95
	ne Emission with Oxid			107.4		106.25		105.38	107.13
	% Oxidation			48.86	3	49.7		50.38	49.81
Total C	over Emissions with	Oxidation	(kg/year)	158705	.43	156942.53	15	5661.06	158238.43
Total Co	ver Emissions withou	t Oxidatio	n (kg/year)		.55	311815.44	31	3153.67	314557.47
Ren	raining Oxidation Cap	acity(g/m²	'2/day)	0.0		0.0		0.0	0.0

Intermediate cover- 70% Gas Recovery; 12 inches silty clay loam; 1-3: low-medium-high organic content; 25% vegetation; 4: high organic content and 75% vegetation; default saturated bottom.

				IIM Version: 6 k Road Land						
			(	04/13/2012						
		In	Int 1 70%		Т	Int. 3		Int. 4		
	Gas Recovery	70			70% Intermediate		70% Intermediate		1	
	Cover Type	Intermediate In		Intermediate						
	Cover area %	25	96	25%	_	25%		25%		
	Int 1		Int.	2		Int. 3			Int. 4	
Layer 1	SILTY CLAY LOAM	112 8	SILTY CLAY	LOAM 12	SIL	TY CLAY LOA!	M 12	SILTY C	TY CLAY LOAM 12	
Layer 2										
Layer 3										
Layer 4										
Layer 5										
Layer 6										
Layer 7										
Layer 8										
Layer 9										
Layer 10										
				Int 1		Int. 2	Т	Int. 3	Int. 4	
Me	thane Concentration	Base of	Cover	35.55	%	35.55%	1 :	35.55%	35.55%	
Methan	Emission without O	ridation (	g/m*2/day)	210.7	6	202.08	1	197.49	199.23	
Metha	ne Emission with Oxio	dation (g	(m^2/day)	106.0	2	100.16		97.14	97.69	
	% Oxidation			49.72	2	50.44		50.81	51.07	
Total C	over Emissions with	Oxidation	n (kg/year)	156603	.51	147954.18	14	3484.31	144300.69	
	ver Emissions withou				.87	298494.41	29	1712.62	294278.86	
Ren	aining Oxidation Cap	acity(g/m	1^2/day)	0.0		0.0		0.0	0.0	

## Additional CalRecycle CALMIM Simulations for Sensitivity (cont.)

Intermediate cover; 75% Gas Recovery; low organic content; 25% vegetation; Int.1- 12 inches silty clay loam, no flux into bottom- free drainage; Int 2: 12 inches, default saturated bottom; Int 3-4: 15 inches.

				MIM Version: nk Road Lan					
				04/16/2012					
	*	* Int 1				Int 3		nt 4	
	Gas Recovery	Î	75%	75%	Ť	75%	7	75%	
	Cover Type	Inte	ermediate	Intermediate	e l	ntermediate	Interr	mediate	
	Cover area %		25%	25%		25%	2	25%	
*	Int 1		Int	12		Int 3			Int 4
Layer 1	SILTY CLAY LOAN	VI 12	SILTY CLA	Y LOAM 12	SIL	TY CLAY LOAN	₩15	SILTY C	LAY LOAM 15
Layer 2									
Layer 3									
Layer 4									
Layer 5									
Layer 6									
Layer 7									
Layer 8									
Layer 9									
Layer 10	)								
	*			Int '		Int 2		Int 3	Int 4
M	ethane Concentration	Base	of Cover	45.0	%	34.88%	4	5.0%	34.88%
Methar	ne Emission without O	xidatio	on (g/m^2/day	) 389.4	19	206.51	29	91.35	158.55
	ane Emission with Oxi			353.8	37	102.6	24	45.41	25.59
	% Oxidatio	n		17.0	7	50.39	2	6.36	84.07
	Cover Emissions with					151553.09	362	496.11	37800.0
	over Emissions witho					305045.05		350.79	234194.89
Rei	maining Oxidation Cap	oacity(	g/m^2/day)	0.01	1	0.0	(	0.59	1.39

Intermediate cover; low organic content; 25% vegetation; default saturated bottom; Int 1: 75% Gas Recovery, 12 inches silty clay loam; Int 2-4: 18 inches, 50%, 75%, 90% gas recovery.

			Fink F	Version: 5 Road Landf /16/2012						
	* Gas Recovery Cover Type Cover area %	Int 1 75% Intermediat 25%	te Int	Int 2 50% ermediate 25%	Inte	Int 3 75% ermediate 25%	Int 90 Interm 25	ı% ediate		
*	Int 1		Int 2			Int 3			Int 4	
Layer 1	SILTY CLAY LOAM	112 SILTY	CLAY L	OAM 18	SILTY	CLAY LOAM	118	SILTY C	LAY LOAM 18	
Layer 2										
Layer 3										
Layer 4										
Layer 5										
Layer 6										
Layer 7										
Layer 8										
Layer 9										
Layer 10										
	*			Int 1		Int 2	In	t 3	Int 4	
Me	thane Concentration	Base of Cove	r	34.889	%	38.25%	34.8	38%	32.85%	
Methane	Emission without O	xidation (g/m^	2/day)	206.51		140.64		3.23	120.78	
	ne Emission with Oxid			102.6		9.17		71	4.04	
	% Oxidatio	50.39	)	93.54	95.58		96.68			
Total C	over Emissions with	Oxidation (kg/	151553.	.09	13544.8	8438.99		5970.62		
Total Co	ver Emissions withou	ıt Oxidation (k	g/year)	305045.	.05	207737.02		07.18	178409.28	
Rem	aining Oxidation Cap	acity(g/m^2/da	ay)	0.0		28.47	37	.42	43.2	